Wood Shop

Safety and Basic Use

COURSE # WOD101

Version 3.4

Course Synopsis

In this Safety and Basic Use (SBU) class, you will learn how to safely operate the core machines in the TechShop Woodshop including: the sliding compound miter saw (chop saw), the SawStop table saw, the wood drill press, and the wood bandsaw, the dust collector, the dust filter and belt/disk sander.

Time Required: 2 Hours

Tools Required

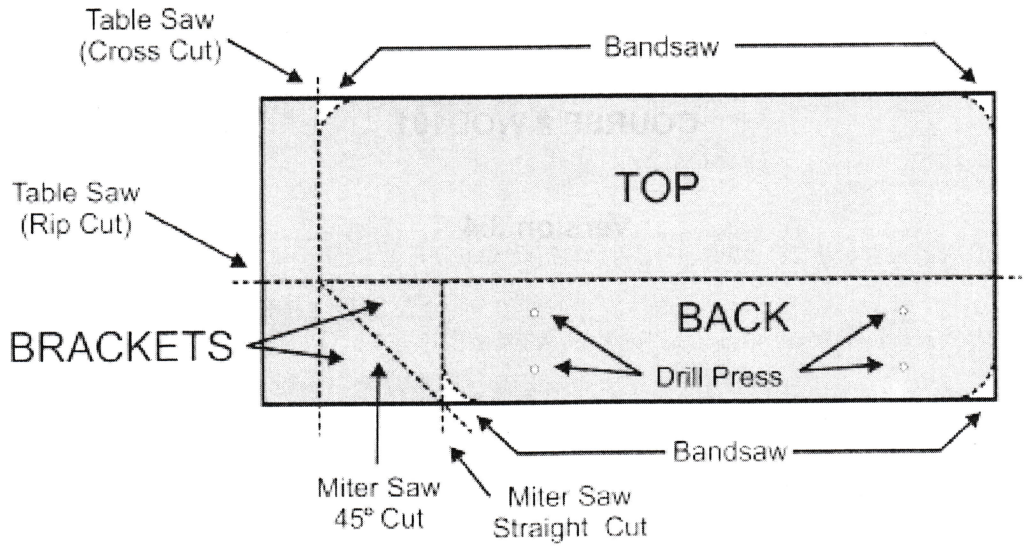
- ☐ Sliding compound miter saw
- ☐ Table saw
- ☐ Wood drill press
- ☐ Wood bandsaw
- ☐ Sanding station
- ☐ Safety gear–eye, ear and lung
- ☐ Tape measure & pencil

Materials Required

- ☐ 2 foot x 10 inch 3/4" pine board

Project Description

The focus of the basic woodshop SBU is to learn proper technique on the basic machines in the TechShop Woodshop. Students will perform a variety of cuts on a plank of wood to receive first hand experience and the parts to build a shelf.



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SAFETY

General Safety

- ◊ Eye protection is required at all times when in the presence of power tools, running or not. If you have to think about it, wear glasses
- ◊ Closed-toe shoes must be worn at all times
- ◊ Long sleeved shirts should be worn when working with chemicals, short sleeved shirts should be worn for anything with a rotary motor (saws, mills, lathes, etc.)
- ◊ Never leave a running machine unattended
- ◊ Never turn your back on a moving machine, even if it's just winding down. Keep your eyes on it until you see it stop completely

Shop Etiquette

- ◊ Never talk to anyone while they are working on a piece of equipment
- ◊ Leave the area you are working in cleaner than when you arrived
- ◊ Begin final cleanup and store your project no later than 11:30 pm
- ◊ Do not use tool table surfaces for assembly

Woodworking Shop Safety

- ◊ **Think Before You Cut** – Think your cuts and movements through before acting. In particular, check to see if there is enough room to complete the cut. *For example: Ripping an 8-foot plywood sheet on a stationary saw means you need 20 feet of free space.*

- ◊ **Keep a Clean Shop** – A cluttered shop is an accident waiting to happen. Keeping your shop clean will help protect you, your tools and others around you from hazards.

- ◊ **Don't Rush** – Allot an appropriate amount of time to complete your projects. A good general rule of approximation is to multiply your expected time by 3. Take breaks when necessary; mistakes happen when there is a rush to complete a job.

- ◊ **Don't Force It** – Allow the tool to do the work. Applying excessive force to your material does not accomplish the job faster, it only puts your safety at risk and more stress on the machine.

- ◊ **Let the Tool Stop** – Giving the power tool time to wind down after a cut is an often-overlooked safety mistake. Even without power, the spinning blade can still do a lot of damage. Don't take your eyes off of it until you see it come to a complete stop.

- ◊ **Unplug tools -** When changing blades or other activities that place your hands near the blade make sure to unplug the tool.

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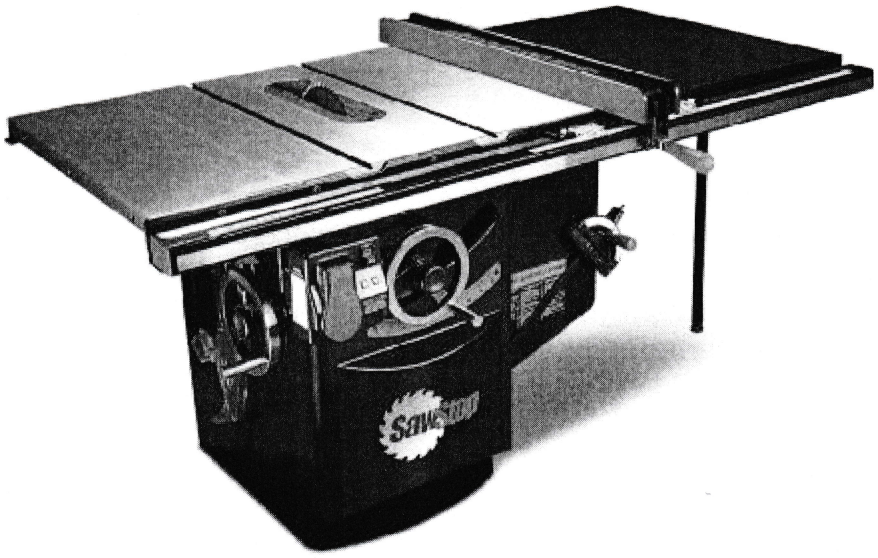
SawStop 10" Table Saw

The SawStop brand table saw is an integral part of the TechShop woodshop. A table saw allows you to make precision cuts by pushing your material across stationary, adjustable, rotating blade on a precision table. Traditionally, table saws are notorious for being one of the most dangerous tools in a woodshop because of accidental body contact with the blade when cutting. The benefit of the SawStop brand is a patented, one-of-a-kind safety mechanism that significantly reduces these types of injuries.



Equipment Specific Safety and Usage Policy

- ◊ You are responsible for the saw as long as the key is signed out to you. Stay with the saw the entire time you have the key, and immediately return it to the front desk when finished.
- ◊ Make all adjustments to the saw and your material while the blade is stopped.
- ◊ Check all wood for any conductive items, such as staples or screws before cutting.
- ◊ Use push sticks, push blocks and other safety devices to help guide and control work pieces when necessary.
- ◊ Do not try to force the saw to do something it was not designed for. Do not try to cut wood faster than the motor can handle.
- ◊ Try to not stand directly in front of or in back of the blade; stand to one side or the other. Material that is kicked back is more likely to miss you if you're off to the side.
- ◊ Use the miter gauge, crosscut sled or rip fence to guide your work as explained later in the SBU. Free-hand cuts are extremely dangerous, inaccurate and not allowed at TechShop. Ask for assistance if needed.
- ◊ Never reach over the blade while it's running, even with the upper guard in place.
- ◊ Do not rip large sheets of plywood or similar materials on the table saw by yourself. Get at least one helper, or use the panel saw.
- ◊ Turn off and let the machine come to a full stop before you remove work pieces or clear scraps away from the blade.
- ◊ Do not use table surfaces as work surfaces for glue up or other assembly processes.

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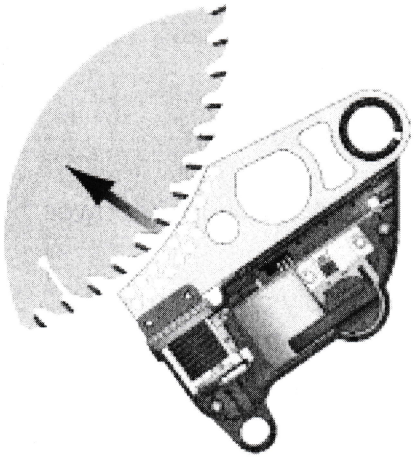

See http://www.SawStop.com/ for video demonstrations.

SawStop Brand Safety Feature

The SawStop is equipped with an amazing feature that can *help* keep you from accidentally injuring yourself. Using electronics, the saw can detect contact with conductive materials – like a finger. If contact is detected, the safety mechanism fires a block of aluminum into the bottom of the blade, causing the blade to stop and drop below the table top in about 5 milliseconds. This will save your fingers, but destroy the saw blade and braking cartridge. This safety mechanism is active at any time the blade is spinning, even while the saw is spinning down after being turned off.

This sensitivity extends to anything conductive, not just fingers, which does limit the materials that can be cut on this saw. The following are lists of materials that are both authorized and not authorized for the SawStop:

AUTHORIZED MATERIALS for the SawStop
(Non-conductive materials)

- dry, nail and staple-free wood
- plastic
- foam
- cardboard
- Corian
- Melamine (tempered hardboard, pegboard)

UNAPPROVED MATERIALS for the SawStop
(Conductive materials)

- wet wood
- aluminum and other metals
- carbon fiber, fiberglass and similar materials
- mirrored acrylic
- carbon-filled materials
- pressure-treated lumber*

IMPORTANT NOTE: Do not attempt to cut any of the materials on the unapproved materials list without assistance. They will trigger the brake cartridge safety and break the blade. You will be charged $200 for a replacement.

Some of these materials may be cut on the SawStop with assistance from Facilities.

There is a "bypass" mode that deactivates the safety system. Only the TechShop Staff have the key for this switch. When in "bypass" mode, the electronics are deactivated, and the safety mechanism will not fire. One of the benefits of this mode is the machine will tell you whether or not your material would have triggered the safety had it been engaged. If you are ever in doubt about your material, find a staff member and they will assist you in making a test cut. The staff member will reactivate the safety mechanism immediately after you have finished.

- **Do NOT let anyone use the saw for any reason while the safety mechanism is disabled.**
- **Do NOT leave the saw until the safety has been reactivated!**

*Pressure treated wood - The material used to treat the lumber may trigger the safety mechanism, even if the wood is dry, so, please find a TechShop staff member and they will put the SawStop in bypass mode.

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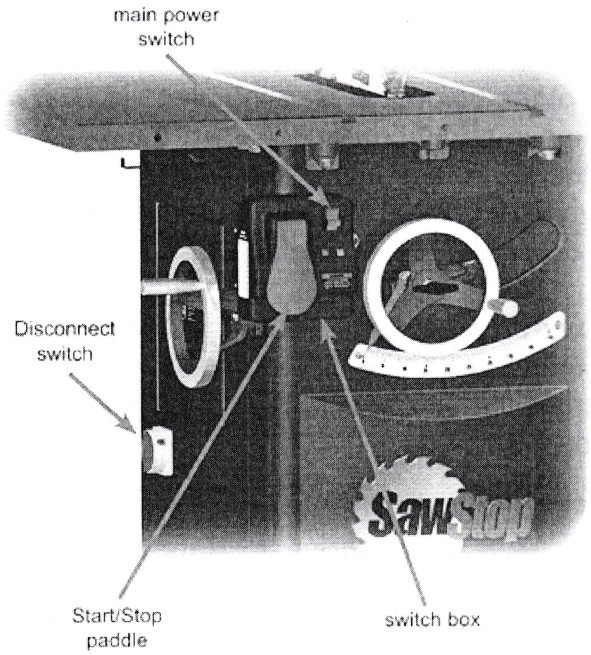
Turning the SawStop Table Saw On and Off



The SawStop is equipped with:

- an electrical disconnect switch to supply power to the saw
- a main power switch to supply power to the safety system which requires a key to activate
- a start/stop paddle to turn the motor power on and off.

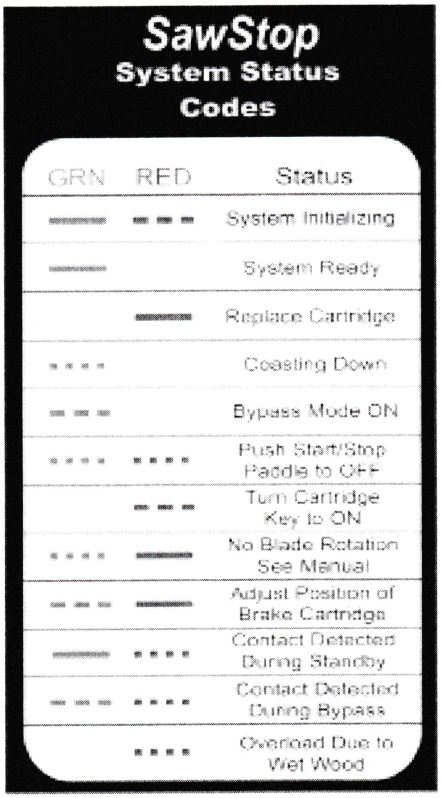
Make sure the Start/Stop paddle is in the OFF position. The start/stop paddle is designed so that it can be reached by the operator's upper leg or knee in an emergency.

Insert Key and turn the main power switch on. This starts the SawStop Safety System, which runs a brief initialization routine. The LEDs will display "READY" (green LED is on solid, red LED is off). The saw is now ready to use.

Do not turn off the main power until the blade has come to a complete stop. The blade can still injure you.

Starting the Blade

1. Pull the start/stop paddle out to start the saw motor.
2. Cut your board(s).
3. Use the miter gauge or a sled when crosscutting for crosscuts (across the grain) or non-through cuts. Use the rip fence for rip cutting (with the grain).
4. Push the start/stop paddle to turn the saw motor off.
5. Avoid touching the blade until it has completely stopped spinning after you have engaged the paddle
6. When you are finished using the saw, turn off the main power switch, and remove the key.
7. Clean the saw and surrounding area, then return the key to the Front Desk.



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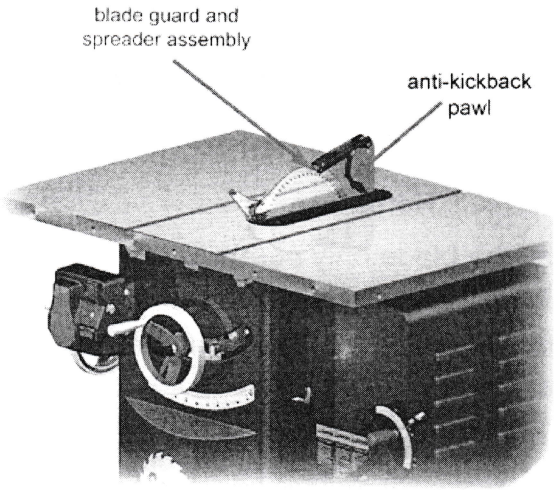
Blade Guard

The blade guard is a plastic housing which protects you from the exposed blade. Using the blade guard is one of the most important steps you can take to prevent injury. The guard is composed of two main elements: the plastic blade shield, and the splitter.

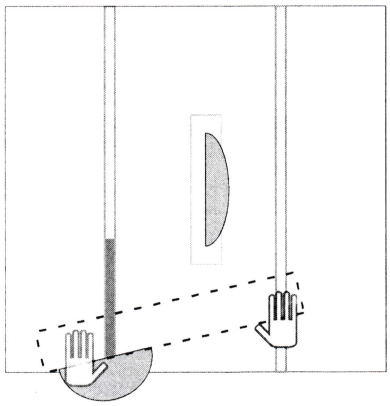


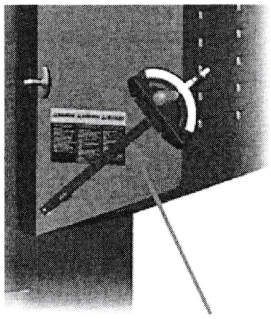
Notes

- The blade shield is clear plastic enclosure that goes around the blade, which helps to keep your fingers away from the blade
- The splitter is the metal support for the guard. The main purpose is to prevent wood's natural springing action from clamping shut against the back side of the blade, causing a kickback. In aid of that job, the splitter also has a pair of claws, called anti-kickback pawls. Their job is to try to dig into the wood during a kickback to prevent it from flying off the saw at high speed

This saw is equipped with a narrow profile blade guard that allows you to use the rip fence even when making narrow rip cuts.

These are only safety enhancements – you still need to maintain control at all times.





Miter Gauge

A miter gauge is attached to the front right side of the saw cabinet. This tool slides into precision channels on the table and allows you to easily cut your piece at an angle (miter cut) and perform crosscuts (cuts across the grain of the wood).

Notes

- Do not use the miter gauge in the slot on the left of the blade when making bevel cuts; the tilted blade will likely cut into it, and will pass too close to your hands
- Avoid using the miter gauge for long pieces of wood it's not very stable. The crosscut sled is better suited for this type of operation
- Do not use the rip fence when using the miter gauge the cut off pieces tend to get caught between the blade and fence and be launched back at the user

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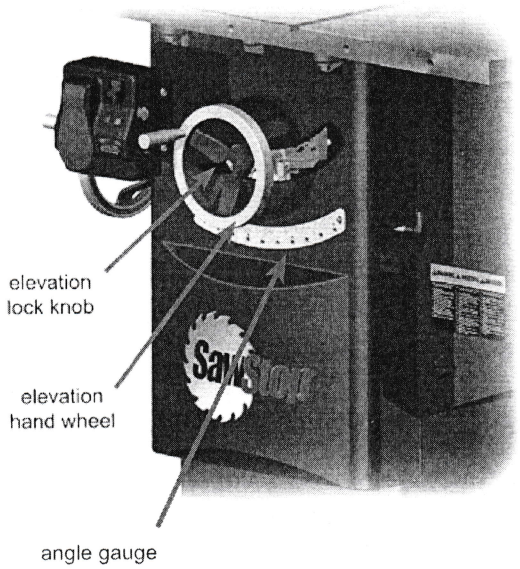
SawStop Blade Adjustments

Adjusting the Blade Height

The height of the blade can be adjusted from 1/8" below the table top to 3-1/8" above the table top.

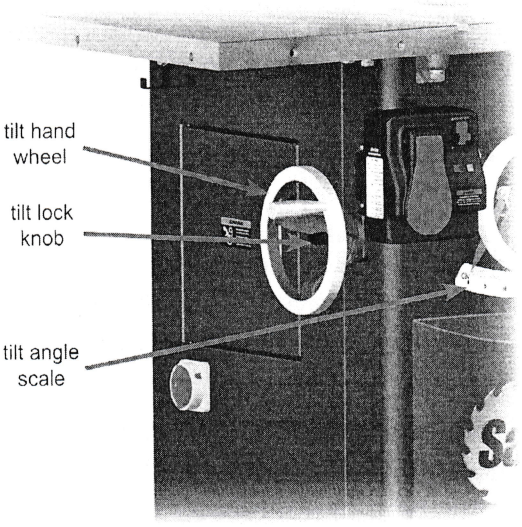


1. Loosen the elevation lock knob. (center front of saw, above angle gauge.)
2. Turn the elevation hand wheel clockwise to raise the blade, and counter-clockwise to lower the blade.
3. Lock the blade height by tightening the elevation-locking knob.

Notes

- On thin material, the blade only needs to be 1/4" above the material
- On thicker material, raise the blade high enough so that the gullets (the low points between the teeth) are just above the top of the wood. This allows sawdust to escape from the width of the cut (kerf)

Adjusting the Blade Tilt Angle



The tilt angle (bevel) of the blade can be adjusted between 0 and 45 degrees.

1. Ask TechShop facilities staff member to remove blade guard and base plate.
2. Loosen the tilt lock knob, located on the left side of the saw.
3. Turn the tilt handle wheel clockwise to increase the tilt angle, and counter-clockwise to decrease the tilt angle.
4. Lock the tilt angle by tightening the tilt-lock knob.

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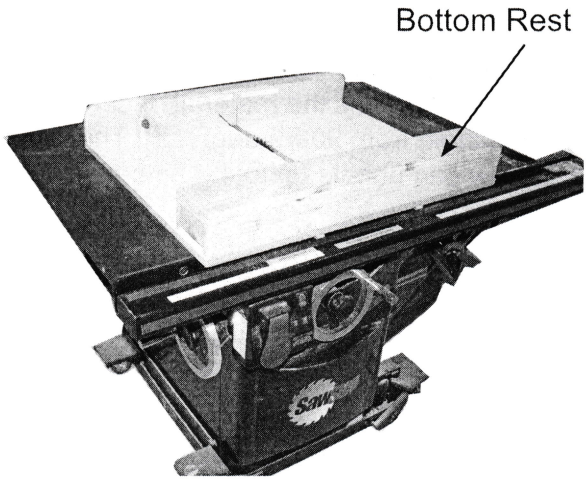
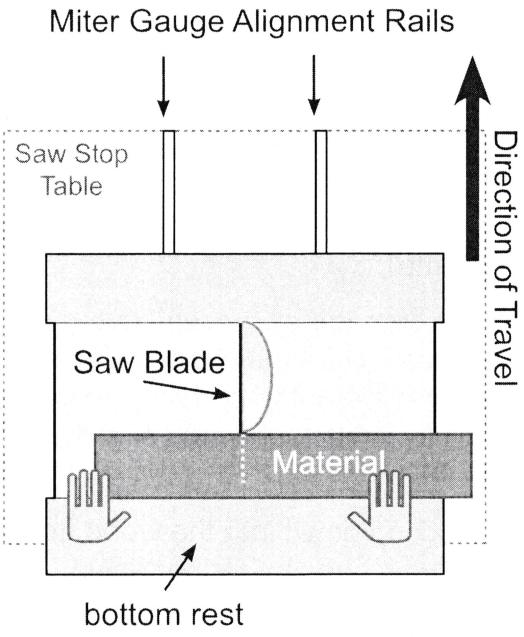
Crosscut Sled

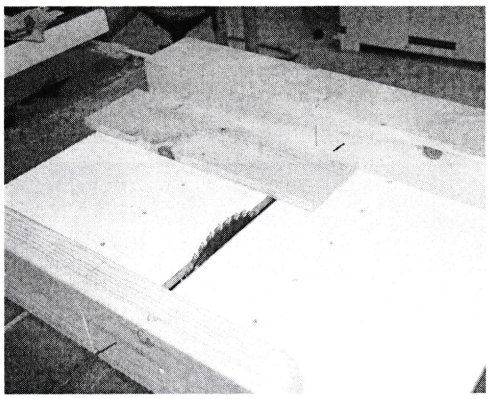
The crosscut sled is a TechShop built accessory designed to make crosscuts safer and easier than with the miter guide. The sled has a much wider contact area to support the wood when crosscutting. It keys into both miter guide slots, and is thereby more accurate. The sled is also the safest way to make beveled crosscuts.





To use the crosscut sled:

1. Ask a TechShop facilities staff member to remove the blade guard.
2. Place the sled on the table top, with the two rails on the bottom of the sled in the two grooves on the table top. Slide the sled back and forth a few times to clear sawdust out of the guide grooves.
3. Make sure the outfeed table is in its correct place behind the table, and that the sled stops correctly before making your cut. The sled is built to stop sliding forward when the rails reach the end of their travel.
4. Place your material on sled as seen in the illustration on left.
5. Push the sled evenly from both sides making sure to keep your hands out of the path of the blade.
6. When you have completed all of your cuts, have a TechShop staff member reinstall the guard and store the sled.



Notes

- Remember that with the blade guard removed, you must not let the saw out of your sight until you reinstall the guard. Remove the key if you need to leave, even for a moment.
- If your material is long enough to hang out past the end of the sled significantly, put an additional piece of wood (3/4"-1") under the tail end of your material to support it.
- If your material is less than 12" wide use the compound miter saw (chop saw).

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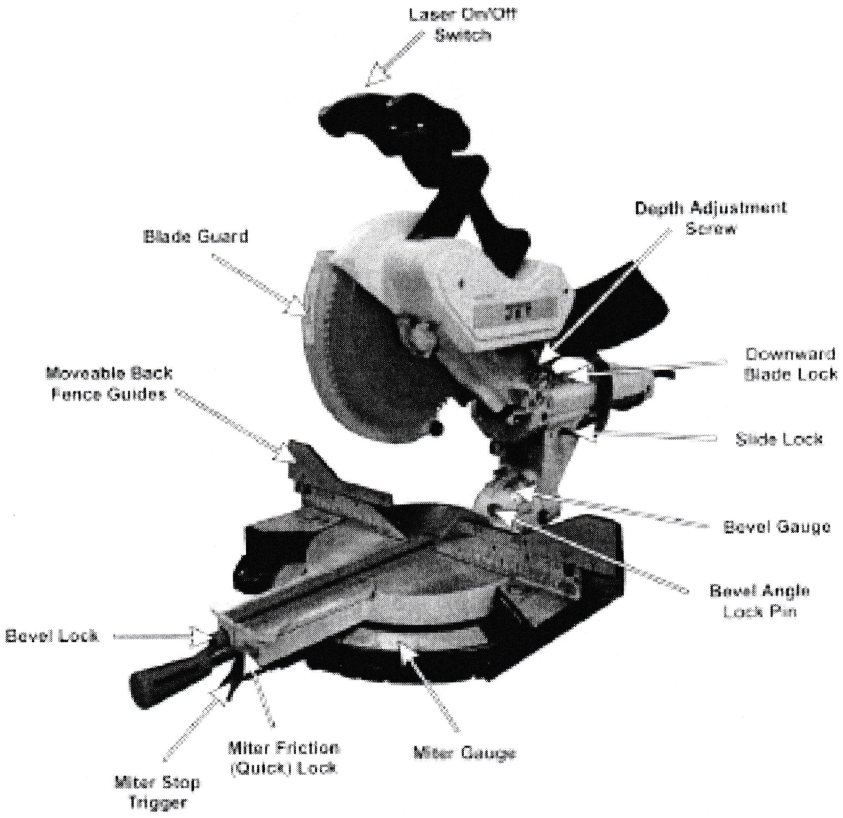
Sliding Compound Miter Saw

The sliding compound miter saw (or "chop saw") is used to make reasonably short straight cuts either at an angle or straight across the material. It can also make beveled cuts (cuts with the blade tilted over to the side at any angle from 90-45 degrees). This allows for a wide range of single and compound angles to be cut. This saw can handle up to 4x12 nominal lumber.



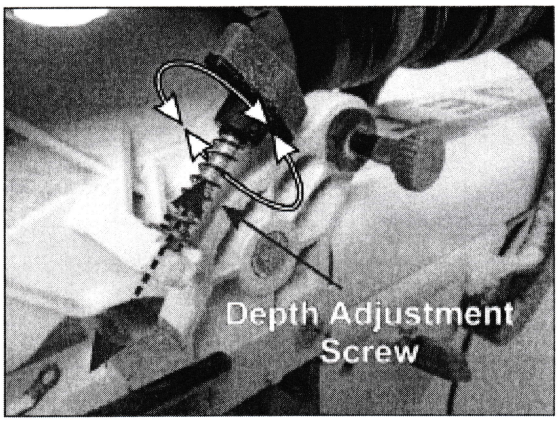
Using the Miter Saw

1. First make any adjustments to blade angle or bevel.
2. Push your material all the way up to the fence. (make sure there isn't any sawdust in the corners in the way). Clamp the material in place if necessary.
3. Firmly hold the material with your left hand, at least 6" away from the blade path. (be mindful of where you place your thumb).
4. Pull the carriage all the way out towards you. Start the motor with the trigger, and allow it to come up to full speed. (it will buck upwards slightly. This is OK).
5. Slowly chop down into the wood until the saw won't go any farther down.
6. Smoothly and slowly push the slide all the way to the rear until it stops.
7. Once the cut is done, release the trigger (keep holding the saw down until the blade spins to a complete stop, and then allow it to rise).

Compound Miter Saw Adjustments

Depth Adjustment - This is a screw that adjusts how deeply the saw cuts into the material, for doing dado cuts or slots. It is generally left unscrewed so that it doesn't interfere with anything.

- To control the depth of the cut, screw it in until it stops the saw at the correct depth.
- Several test cuts will be needed to adjust this.
- If you adjust the depth stop, you are responsible for undoing it when you're done.



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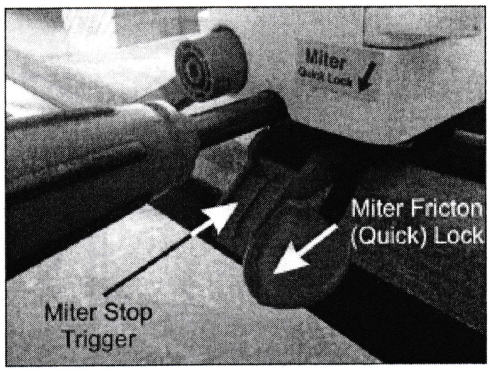
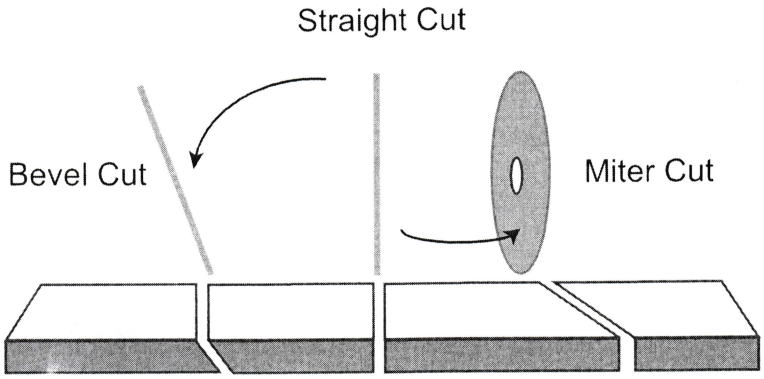
Miter Cuts

TechShop's compound miter saw allows you to control the angle of the cut in one of two ways.

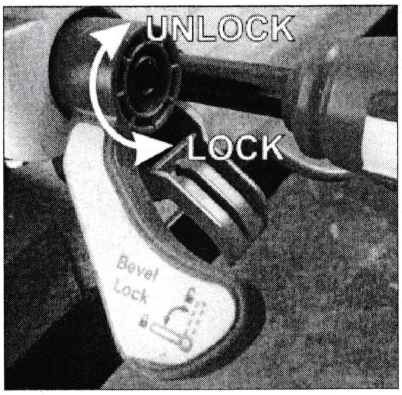


Miter stop trigger - For common angles such as 90° and 45° the chop saw has a series of stops built in to locate these positions quickly and accurately. To adjust the miter angle, you must pull up on the trigger to retract the locating pin, then swivel sideways with the miter handle. This will rotate the entire head sideways to the desired angle. Release the trigger near a preset angle position stop and the locating pin will lock the saw at that angle.

Miter friction lock- This lever uses friction to lock the position of the saw instead of a locating pin. This will lock the saw at any angle, not just the preset stops. Flip it down to lock the saw at its current angle.



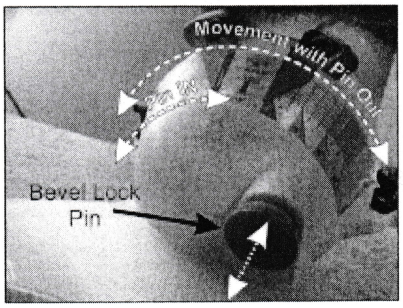
Bevel Cuts



This saw also allows you to control the angle of the cut relative to the back fence:

Bevel Lock - The bevel lock allows the head to tilt for cuts that have an angle relative to the base.

Bevel Lock Pin - This is the red knob sticking out of the front of the central machine joint on the base. When engaged this pin prevents the head from angling to the right, creating a perfect stop at 90° perpendicular to the table. It is possible to retract the limit pin, and then tilt the head to the right.



- Pull it out the bevel limit pin to unlock head. Push it in to relock
- With the limit pin removed, it is also possible to cut into the back fence. Make sure the fences are adjusted out of the way before cutting
- To return the saw to 90°, push the limit pin back in, and tilt the head until it stops against the pin. Relock the bevel lock
- The bevel lock is a simple clamp. Flip it up to unlock, down to lock
- The bevel lock ***must*** be locked before you attempt a cut

Either of these locks will prevent the head from rotating. Both must be released to swivel the head.

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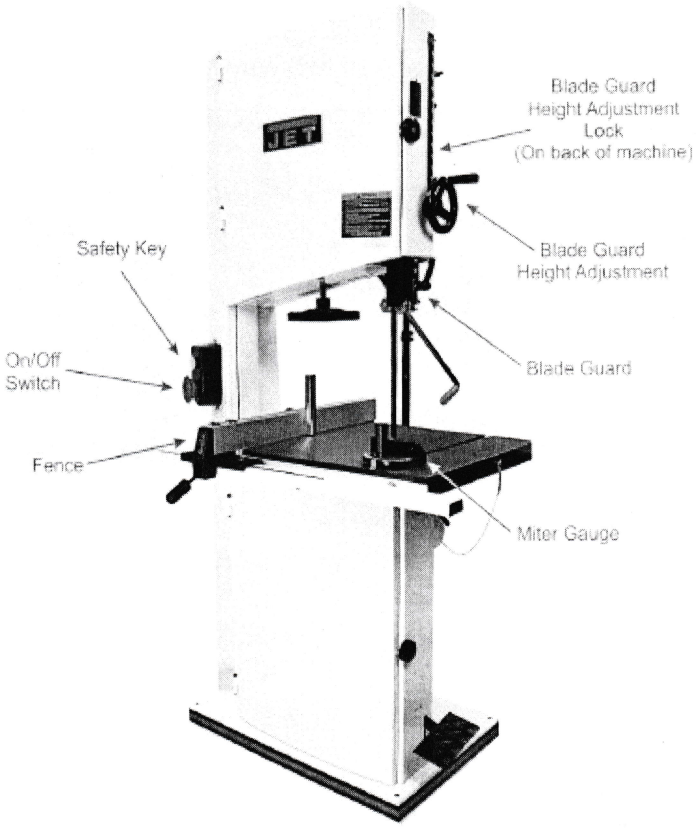


Vertical Band Saw

The vertical band saw is quite versatile and can make either straight or curved cuts in material that is much thicker than the table saw can handle. It consists of a pair of large wheels, with a seamless steel saw blade wrapped around them.

Long straight cuts are not as precise as those possible with the table saw. The thicker the material gets, the less accurate the cut will be. With that in mind, the vertical band saw is best used for curved cuts that cannot be done with a table saw, or for material that is too thick for the table saw.

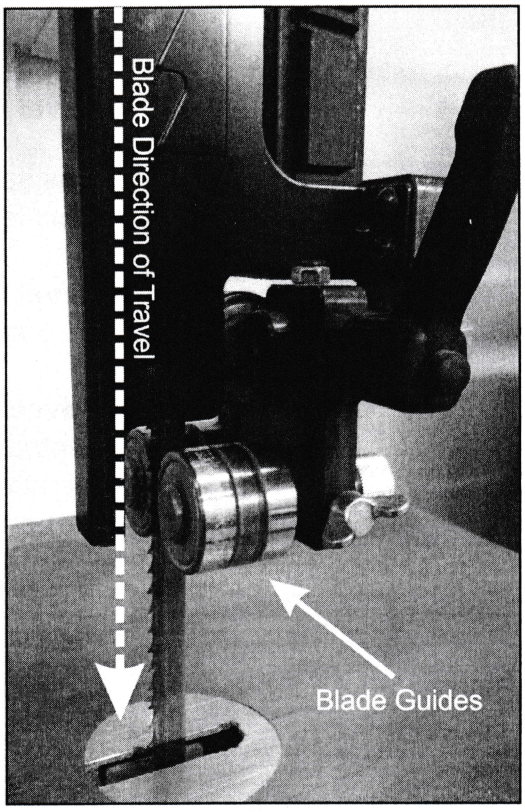
Blade Guard Height - This is the primary adjustment made for every cut, and is the only adjustment you can make to the saw.

There is a knob on the rear of the upper housing of the saw, directly above the guard. This loosens the guard so that it can be raised or lowered. Adjust it so that it sits 1/8" to 1/4" above your material, and then clamp it tight again.

The purpose of this is twofold:

- The guard contains guides that keep the saw blade cutting straight. They need to be as close to the top of your work as possible
- The guard protects your fingers from the saw blade
- The blade guard height is the only adjustment members should be making. If the saw is not cutting correctly ask a TechShop facilities staff member for assistance

Blade Guard Assembly



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Using the Vertical Band Saw

1. Adjust the blade guard so that it sits 1/8" to 1/4" above the top of your material.
2. Turn the saw on, and let the blade come up to full speed.
3. Begin your cut by placing the wood flat against the table, and feeding it slowly into the blade. Continue cutting until the cut is finished, and the blade clear of the material.

Notes

- The saw takes a ***very*** long time to stop, after the power is turned off. Be aware, and keep your hands away from the blade until it is completely stopped
- Do not attempt to back up in a deep (+2") cut, especially a curved one. You will very likely pull the blade off the wheels
- Scrap material: As you cut, there will be small bits of wood that are trimmed away from your material. These can collect on the table in the area around the blade, or even get stuck in the slot in the throat plate. Do not attempt to flick these away with your hands. Stop the blade before removing them
- If the blade cannot cut a radius as small as you like, cut wide, and then make a second (or third) cut closer to your line
- To stop a cut in the middle of a board, or to get the blade out of an incomplete cut, stop the motor, and wiggle the blade out backwards with the motor stopped
- To end a cut in the middle of a board, or simply to clear scrap, you can make relief cuts. These are cuts from the edge of the board to the cut line. Your real cut will intersect them as you go, allowing the scrap to fall away in sections. It's better to make many relief cuts, rather than trying to fight the blade through a tight turn, or long curved cut
- Cut radius. The radius of the curve that the saw will cut is a function of the width of the blade from front to rear. The wider the blade, the larger (wider) the minimum radius it will cut, the trade-off being that it will do better with straight cuts. Narrow blades will cut a tight radius, but can't cut a straight line. The 1/2" blades that TechShop normally keeps in the band saw will cut about a 2" radius. It's a reasonable compromise blade

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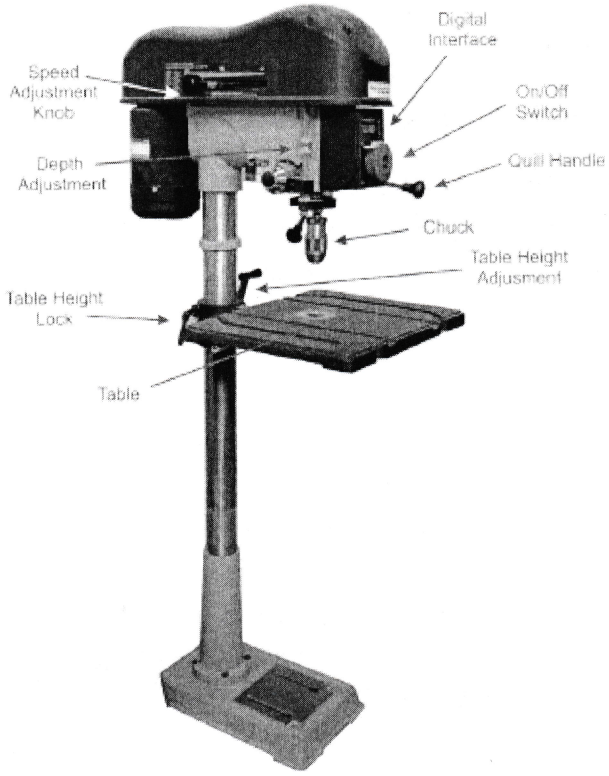

Drill Press

A drill press is a spindle mounted on a post with a height-adjustable table below it. You can adjust the speed by either changing belts (manual) or with a speed adjustment knob if it has a variable speed drive. The chuck can hold drill bits, hole saws & sanding drums.

Drill presses have several advantages over handheld drills:

1. Greater rigidity and accuracy. They can be set to hold work at any angle, and they always drill straight down, which makes holes much more accurate. This is critical with smaller bits that break easily if they wander off course.

2. More power and slower speeds, which allows the use of larger bits and hole saws.

3. The ability to apply constant downward pressure to the work while drilling.

Notes

- Don't leave the key in the chuck. It will go flying across the room if you forget and could seriously injure you or someone else nearby. (Some chucks at TechShop are keyless and this does not apply)
- Always grip the drill bit with the teeth of the chuck as close to the flutes (spirals) of the drill bit as possible. Do not grab the flutes themselves – the chuck will grab off-center and damage the flutes
- It is possible to grab bits off-center – especially with small bits. Always check to see that your drill is centered in the chuck. Spin the chuck one full revolution by hand before turning it on, to make sure it's set up correctly
- Always set up your drilling so that the drill either passes through the hole in the center of the table, or will drill into a piece of scrap wood and not the table
- Always hold material securely. The larger the bit, the stronger the work needs to be clamped
- Ease up on the down pressure as you break through your material
- Use the right cutting speed for the material and drill size
- If the drill binds, shut the motor off, and spin the chuck backwards by hand to work the bit out
- Check sharpness of drill bit. If it smokes or screeches, it's dull and you should sharpen or replace it. If you see rainbows on the steel of your bit, it's been overheated. Replace it
- When drilling deep holes, pull the drill out of the hole every few seconds to release the shavings
- Do not use hole saws with diameters larger than 1.5" in keyless chucks. It can destroy the chuck.

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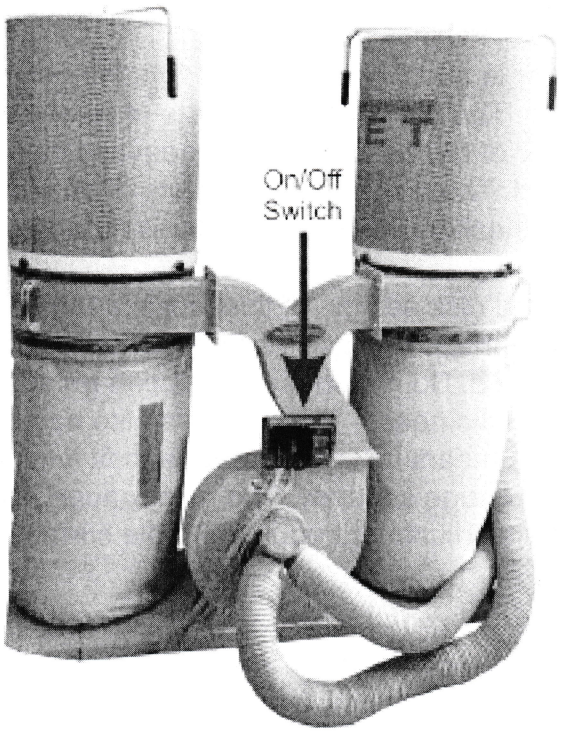


Dust Collection System

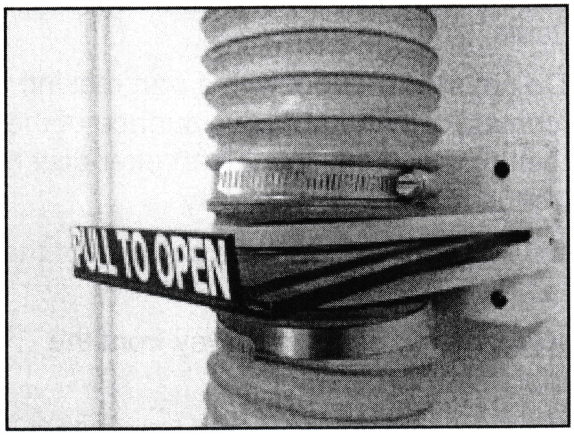
Dust collector

The dust collector is a large vacuum system that pulls chips and dust directly from tools. There is a 4" black plastic hose running from the collector to each machine throughout the woodshop.

Operation

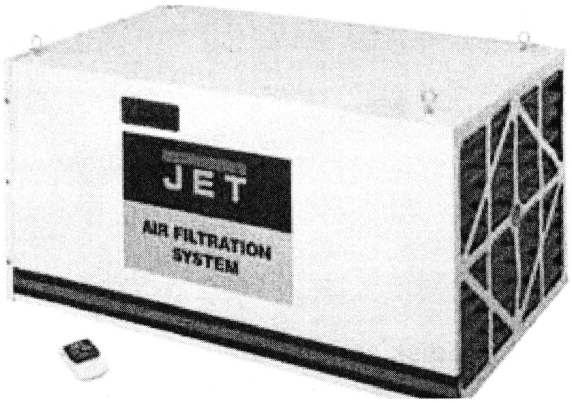
Before running a woodshop machine, check to make sure the blast gate between the machine and the dust collection system is open. For better suction, check the woodshop and close any open gates on non-occupied machines.

- Turn on the dust collector whenever running tools
- At cleanup time, you can use the dust collector to vacuum the floor at some locations
- Avoid picking up nails or other objects



Dust filter

The dust filter removes dust from the air – it works in tandem with the dust collector to keep the overall working environment dust free.



- Use the remote control to turn on the dust filter. It should be running at all times when the wood shop is occupied.
- If you encounter problems with the amount of dust in the air ask a TechShop facilities staff member to inspect the filter
- It is still recommended that you use appropriate dust and inhalation safety gear such as OSHA approved dust masks

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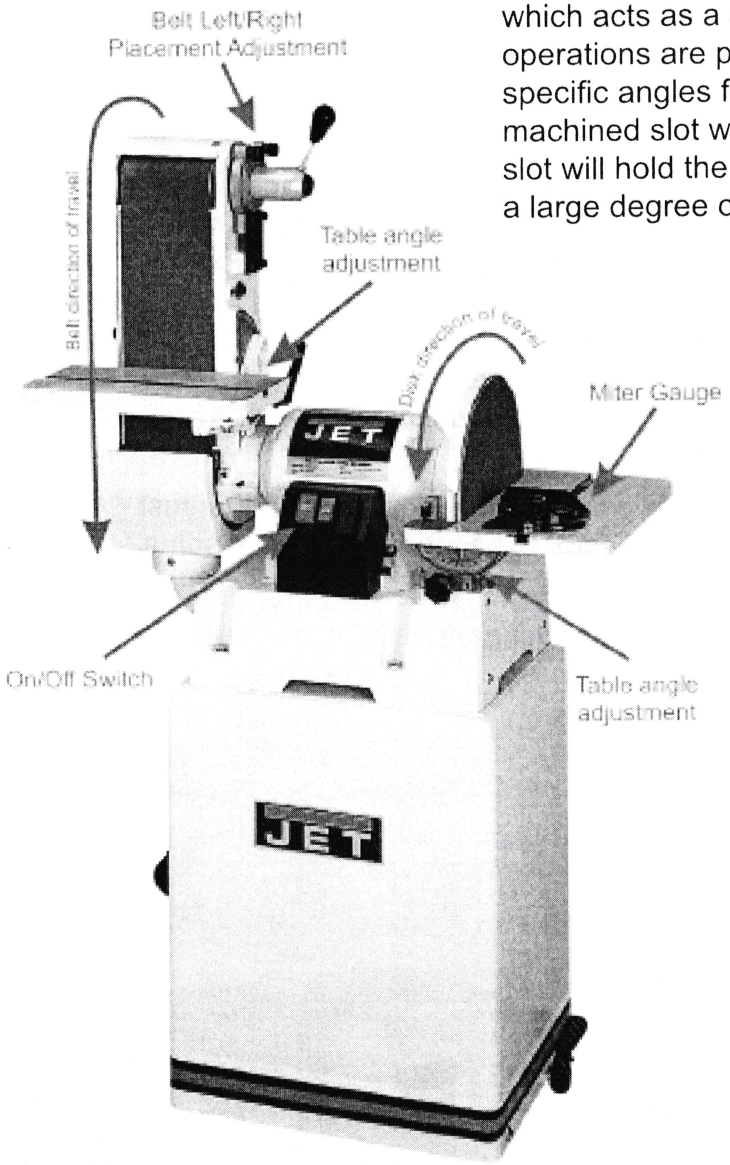
Belt and Disk Sander

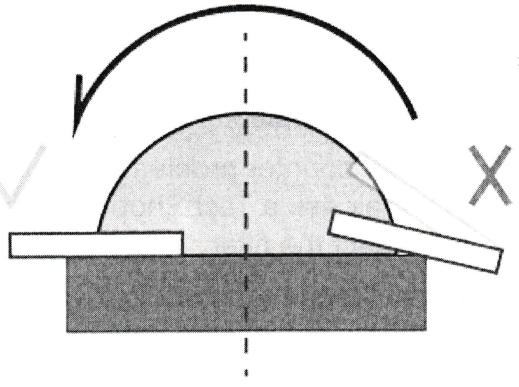
A belt and disk sander is a tool which is used to sand down wood for finishing purposes. The belt sander consists of an electrical motor that turns a pair of drums on which a seamless loop of sandpaper is mounted. The disk sander consists of an electric motor on which an adhesive disk of sandpaper is mounted.

Below both the belt and disk section of this tool is a table which acts as a solid surface to place your part on as sanding operations are performed. Both of these tables can be set to specific angles for specific needs. These tables also have a machined slot which is meant for a miter gauge to fit into. This slot will hold the miter gauge securely. The miter gauge allows for a large degree of angle adjustment upon the table surface.



Equipment Specific Safety

- Always hold part securely against table. Do not hold the part while hovering above the table
- Do not start the tool with a part making contact with the abrasive surface of the belt or disk. Only touch part after disk has reached maximum velocity
- Be aware of the direction of travel of the belt or disk
- Keep hands back and away from the abrasive surfaces
- When rounding edges and full contact cannot be made with the table, make sure to at least use the table as the pivot point



On the disk sander keep your work flat on the table and to the downward side of the spinning disk. Otherwise, the part can be picked up by the upward movement of the disk.

Note: Not all disks spin the same direction. This is for illustration purposes only. Check before use.

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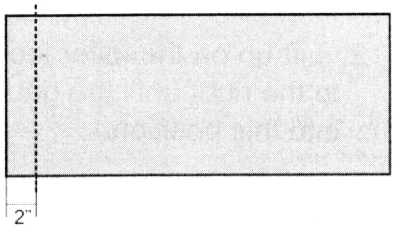
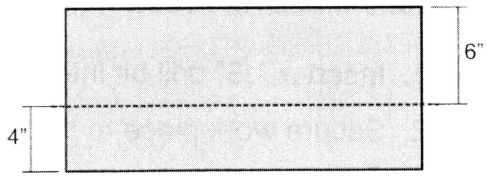
Project Description

Machine 1: Table Saw



Crosscut:

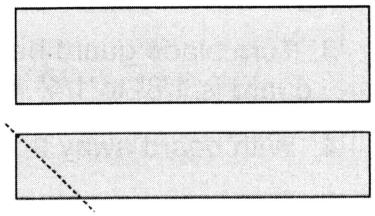
1. Place the crosscut sled into the 2 grooves on the SawStop table.
2. Place board into sled while holding against the bottom rest securely and your hands are away from the path of the blade. Pull the blade start/stop paddle out to start the blade.
3. Slowly and evenly push the crosscut sled into the path of the blade while exerting downward pressure on the board.
4. Guide the crosscut sled all the way through the blade until the cut is complete.
5. Push the Start/Stop paddle in to stop the blade.



Rip Cut:

1. Turn the main disconnect switch to ON.
2. Lift the fence lock and move the fence until the gauge reads 2 inches on the right gauge and lock the fence down by pushing the fence lock lever downwards.
3. Place the key in the main power switch slot and flip upwards to turn the switch box on. Wait for the safety to load. After a few seconds the red light will stop flashing and only a solid green light will be shown.
4. Pull the blade start/stop paddle out to start the blade. Slowly and evenly push your board into the path of the blade while exerting downward pressure on the board.
5. As your hands get within 12" of the blade, start using a push stick and guide the board all the way through the blade until the cut is complete.

Machine 2: Sliding Compound Miter Saw



Angled Cut:

1. Lift up on the miter lock trigger and rotate the head of the saw to the right until the gauge shows 45 degrees and the head locks into this position.Turn on dust collection system.
2. Place your piece of plywood on the saw's table and hold securely with hand away from path of blade.
3. Pull trigger on the saw and wait for saw to spin up to its maximum velocity.
4. Slowly and evenly pull the saw out towards you, plunge downwards all the way and move the saw all the way towards the back until it stops.
5. Release the trigger and keep holding the saw down until blade spins to a stop and then allow it to rise.

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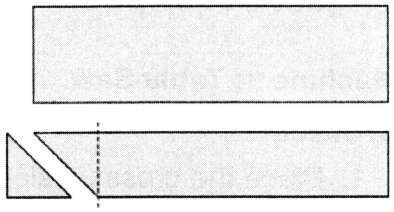
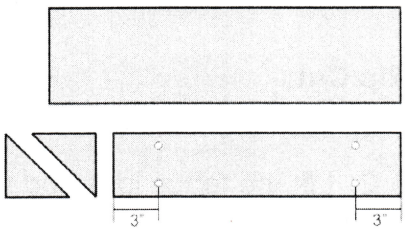
Straight Cut:



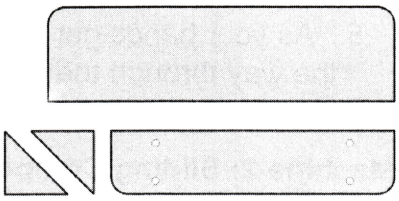
1. Each student will cut a 3 foot length of off of the stock material.
2. Lift up on the miter lock trigger and rotate the head of the saw to the right until the gauge shows 0 degrees and the head locks into this position.
3. Place your piece of plywood on the saw's table and hold securely with your hand away from path of blade.
4. Pull trigger on the saw and wait for the saw to spin up to its maximum velocity.
5. Slowly and evenly pull the saw out towards you, plunge downwards all the way and move saw all the way towards the back until it stops.
6. Release the trigger and keep holding the saw down until blade spins to a stop and then allow it to rise.

Machine 3: Drill Press



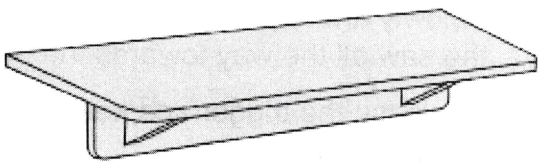
1. Insert a 1/8" drill bit into the chuck and hand tighten.
2. Secure work piece to the table surface using C-clamps.
3. Unlock table and move to appropriate height for drilling.
4. Align desired hole location with the drill bit.
5. Turn drill press on and wait for the bit to reach maximum velocity.
6. Using the quill handle, push drill bit into work piece until hole is completed.
7. Turn the drill press OFF.

Machine 4: Bandsaw



1. Draw desired cut pattern onto your board with a pencil.
2. Place board on table surface and loosen guard by turning the guard the lock knob counter clockwise.
3. Turn blade guard height crank in appropriate direction until guard is 1/8" to 1/4" above the board you wish to cut.
4. With board away from the blade, turn blade on and let it spin up to maximum velocity.
5. Slowly and evenly push the board into the blade and turn board as needed to complete the cut.
6. When cut is completed, turn the blade OFF and wait for the blade to fully stop. Remove scrap material.

Machine 5: Belt and Disk Sander (optional)



Smooth and round edges with the belt and disk sander.

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USEFUL LINKS

www.woodworkersworkshop.com
has quite a few project tutorials for a variety of projects

www.woodcraft.com
Wood working tools, plans, and supplies

www.rockler.com
Shop for Woodworking Tools, Plans, Finishing and Hardware online at Rockler woodworking and Hardware.

www.popularwoodworking.com
Woodworking Tips, Techniques, Project Plans, Tool Reviews, and Woodworking Videos from Popular Woodworking Magazine.

www.woodmagazine.com
Online Community, Forums, Materials Guide, Woodworking Plans, Tips & Techniques, Tool Review, and Store.

www.newyankee.com
Website for PBS hit show "The New Yankee Workshop" which shows start to finish woodworking projects from the simple to complex.

WHAT'S NEXT?

After successfully completing this Woodshop SBU, you might be interested in these classes:

CNC Level 1: Concepts of CNC
CNC Level 2: CAD to CAM
CNC Level 3: ShopBot SBU
Woodshop: Planer/Jointer and Table Router SBU

The Fine Print

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